A Closer Look at the Anatomy of Spiral Galaxies

Peters, Stephan

- The near constant value of the maximum surface brightness of the HI along a significant fraction of the major axis in many edge-on galaxies is a clear indication of HI self-absorption. (Chapters 1 and 2)
- Treating the HI of an edge-on galaxy as optically thin will underestimate the HI mass of a galaxy by at least 23 to 30%. If the HI is fragmented into clouds, then even more HI can remain hidden. (Chapter 2)
- The assumption that the HI is optically thin or self-absorbing has a profound impact on the measured scale-height, face-on surface density and velocity dispersion of the gas. (Chapter 3)
- It is very hard to measure the velocity dispersion of the HI in edge-on galaxy accurately (Chapter 3).
- The measured shape of the dark matter halo through observations of edge-on galaxies is very susceptible to errors due to the many underlying assumptions. (Chapter 5)
- Given the assumptions and uncertainties involved in working with observations, one should always use advanced optimization techniques that allow these errors to be estimated.
- Scattered light from the stellar disk of a face-on galaxy will often look like a stellar halo around that galaxy. This light can hide the signature of a truncation in the stellar disk. (Chapter 7)
- Science is in need of a very thorough revision of its employment and career strategy.
- As astronomy transitions ever more into a desk job, we run the risk of forgetting the feeling of magic and wonder one gets from simply looking at the night sky.
- Ink is the new black gold.